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(71)Applicant : HITACHI LTD
 HITACHI CAR ENG CO LTD

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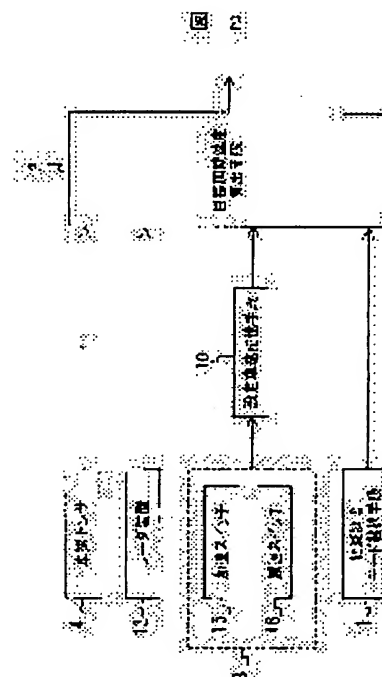
(72)Inventor : KONDO EIICHIRO

(54) AUTOMATIC SPEED CONTROLLER FOR VEHICLE

(57)Abstract:

PROBLEM TO BE SOLVED: To solve problems that a driver is given a feeling of incongruity due to delay in actual response of a vehicle for change in set vehicle speed operated by the driver, and running feeling is adversely affected in an automatic speed controller for the vehicle.

SOLUTION: An acceleration and deceleration mode selection switch is provided as an acceleration and deceleration mode selection means or information from a mode selection switch of automatic transmission is obtained to select acceleration and deceleration mode. Running mode is learned from driver's driving characteristics to select acceleration and deceleration mode automatically in order to obtain running feeling in which driver's intention is reflected.



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CLAIMS

[Claim(s)]

[Claim 1] The automatic speed regulating device of the car characterized by to establish a mode-selection means whenever [acceleration-and-deceleration / which can choose whenever / acceleration-and-deceleration / which a driver expects a real vehicle-speed detection means detect the real vehicle speed of a car, a means set up the vehicle speed which a driver wishes, and a setting vehicle-speed storage means memorize said vehicle speed, in the automatic speed regulating device of the car which operates a throttle actuator, a change gear, and a brake in order said real vehicle speed in agreement with the setting vehicle speed].

[Claim 2] The automatic speed regulating device of the car characterized by forming a mode selection switch whenever [acceleration-and-deceleration] as a mode selection means whenever [said acceleration-and-deceleration] in the automatic speed regulating device of a car according to claim 1.

[Claim 3] The automatic speed regulating device of the car characterized by getting the information from the mode selection switch of an automatic transmission, and choosing the mode whenever [acceleration-and-deceleration] as a mode selection means whenever [said acceleration-and-deceleration] in the automatic speed regulating device of a car according to claim 1.

[Claim 4] The automatic speed regulating device of the car characterized by learning transit mode from the operational characteristics of a driver, and choosing the mode whenever [acceleration-and-deceleration] automatically as a mode selection means whenever [said acceleration-and-deceleration] in the automatic speed regulating device of a car according to claim 1.

[Claim 5] The automatic speed regulating device of the car characterized by forming the one-touch switch only for sudden acceleration in claim 2, claim 3, and the automatic speed regulating device of a car according to claim 4.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the automatic speed regulating device of the car which maintains the real vehicle speed which is the travel speed of a car at the setting vehicle speed which a driver wishes.

[0002]

[Description of the Prior Art] As an automatic speed regulating device of this kind of car, like JP,9-86224,A, it asks for whenever [target acceleration-and-deceleration] from the vehicle speed deflection of the setting vehicle speed and the real vehicle speed which the driver set up, and the automatic speed regulating device of the car which realizes constant-speed transit by controlling a throttle based on whenever [this target acceleration-and-deceleration] is known.

[0003]

[Problem(s) to be Solved by the Invention] However, with said conventional technique, since whenever [target acceleration-and-deceleration / at the time of an automatic speed control] is computed from vehicle speed deflection, the intention of a driver may necessarily be unable to be reflected.

[0004] In this invention, it is in establishing a mode selection means whenever [acceleration-and-deceleration], and offering the automatic speed regulating device of the car which can realize car behavior according to the intention of a driver so that whenever [suitable for liking of a driver / acceleration-and-deceleration] may be obtained.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention is carried in a car. The actuator, change gear, and brake of this car which can adjust a travel speed, A real vehicle speed detection means to detect the real vehicle speed of a car, and a means to detect the distance between two cars to a precedence car, A setting means by which the setting vehicle speed which a driver wishes can be operated, and a setting vehicle speed storage means to memorize said setting vehicle speed, Whenever [acceleration-and-deceleration / which can choose whenever / acceleration-and-deceleration / which a driver wishes] A mode selection means, In case whenever [target acceleration-and-deceleration] is computed in order to make the real vehicle speed in agreement with the setting vehicle speed, whenever [target acceleration-and-deceleration / which compute whenever / target acceleration-and-deceleration / based on the condition and vehicle speed deflection (difference of the setting vehicle speed and the real vehicle speed) of a mode selection means whenever / said acceleration-and-deceleration] A calculation means, It is the automatic speed regulating device of the car characterized by operating said actuator, change gear, and brake so that whenever [said target acceleration-and-deceleration] may be filled.

[0006] In this invention, the above-mentioned purpose can be attained as a mode selection means whenever [said acceleration-and-deceleration], for example in the automatic speed regulating device of the car of said publication by forming a mode selection switch whenever [acceleration-and-deceleration], or getting the information from the mode selection switch of an automatic transmission, choosing the mode whenever [acceleration-and-deceleration], or learning transit mode from the operational characteristics of a driver, and choosing the mode whenever [acceleration-and-deceleration] automatically.

[0007]

[Embodiment of the Invention] Hereafter, the example which embodied this invention is explained according to drawing 1 - drawing 5.

[0008] Drawing 1 is the block diagram showing the configuration of the automatic speed regulating device of the car of this example.

[0009] The automatic rate control section 1 computes whenever [target acceleration-and-deceleration] based on the difference of the input of the mode selection means 11, the above-mentioned setting vehicle speed, and the above-mentioned real vehicle speed whenever [acceleration-and-deceleration] in order to make it in agreement with the setting vehicle speed which the real vehicle speed was inputted from the speed sensor 4, and it inputted the distance between two cars to a precedence car from the radar installation 12, and was inputted from the driver actuation switch 3, and it outputs it to the engine control section 5. Based on whenever [target acceleration-and-deceleration / which were inputted from the automatic rate control section 1], the engine control section 5 controls an engine 7 and the throttle actuator 6, and carries out the decrease of an increment of the engine power. When a change gear 9 needs to be controlled, a command is outputted to the change gear control section 8 from the automatic rate control section 1 or the engine control section 5, and control of a change gear 9 is performed. Moreover, when a brake 14 needs to be controlled, from the automatic rate control section 1 or the engine control section 5, a command is outputted to the brake control section 13, and control of a brake 14 is performed.

[0010] Next, the processing which derives whenever [target acceleration-and-deceleration] in the automatic rate control

section 1 is explained using drawing 2.

[0011] In drawing 2, the driver actuation switch 3 is an input unit which consists of the acceleration switch 15 and the moderation switch 16 for inputting the setting vehicle speed which a driver wishes. This input device makes the setting vehicle speed increase by a certain vehicle speed width of face, when a driver inputs an acceleration switch 15, when the moderation switch 16 is inputted, it decreases the setting vehicle speed by a certain vehicle speed width of face, and it is memorized with the setting vehicle speed storage means 10. Here, vehicle speed width of face is good also as adjustable also as uniform.

[0012] The mode selection means 11 is a switch which chooses whenever [acceleration-and-deceleration / which a driver wishes] whenever [acceleration-and-deceleration].

[0013] Whenever [target acceleration-and-deceleration], the calculation means 2 computes [whenever / said acceleration-and-deceleration] whenever [target acceleration-and-deceleration] based on the difference of the condition of the mode selection means 11, and the real vehicle speed inputted from the setting vehicle speed set up with the driver actuation switch 3, and a speed sensor 4 so that it may make the real vehicle speed in agreement with the setting vehicle speed.

[0014] Although the distance between two cars to a precedence vehicle is measured with the radar installation 12 at this time, when the distance between two cars to a precedence vehicle is beyond the set point, the setting vehicle speed beforehand set up with the driver actuation switch 3 is held, and when the distance to a precedence vehicle is smaller than said set point, the distance between two cars is maintained at predetermined.

[0015] In order to realize unattended operation control which can reflect the volition of a driver, the mode selection switch 22 is formed [whenever / acceleration-and-deceleration] as a mode selection means 11 like drawing 3 as one example whenever [acceleration-and-deceleration / which can choose whenever / acceleration-and-deceleration / which a driver wishes]. The mode selection switch 22 is divided [whenever / acceleration-and-deceleration / for example, whenever / acceleration-and-deceleration] into the three-stage of switch 24 and the degree smallness switch 25 of acceleration and deceleration inside large switch 23 and whenever [acceleration-and-deceleration]. So that acceleration and moderation are made quick when a driver chooses the large switch 23 whenever [acceleration-and-deceleration], it makes acceleration and moderation common when a switch 24 is chosen inside whenever [acceleration-and-deceleration], and acceleration and moderation may be made late, when the degree smallness switch 25 of acceleration and deceleration is chosen Whenever [target acceleration-and-deceleration] is computed with the calculation means 2 whenever [target acceleration-and-deceleration], and it enables it to choose the mode whenever [acceleration-and-deceleration / which a driver wishes].

[0016] In the case of an automatic transmission (AT and automatic [MT]), like drawing 4 as the second example, a change gear 9 gets the information from the mode selection switch 26 of an automatic transmission as a mode selection means 11 whenever [acceleration-and-deceleration]. The mode selection switch 26 of an automatic transmission For example, it is divided into the three-stage of power-mode switch (sport mode switch) 27, normal mode switch 28, and the economy mode switch (Snow mode switch) 29. Acceleration and moderation are made quick when the power-mode switch (sport mode switch) 27 is chosen. So that it makes acceleration and moderation common when the normal mode switch 28 is chosen, and acceleration and moderation may be made late, when the economy mode switch (Snow mode switch) 29 is chosen Whenever [target acceleration-and-deceleration] is computed with the calculation means 2 whenever [target acceleration-and-deceleration], and it enables it to choose the mode whenever [acceleration-and-deceleration / which a driver wishes].

[0017] Like drawing 5 as the third example, whenever [acceleration-and-deceleration], as a mode selection means 11, transit mode is learned from the operational characteristics 32 of a driver, and whenever [acceleration-and-deceleration] is chosen automatically. For example, when the peculiarity in which a driver breaks in an accelerator pedal 30 and a brake pedal 31 rapidly occurs, acceleration and moderation are made quick, when the peculiarity of breaking in an accelerator pedal 30 and a brake pedal 31 slowly occurs, acceleration and moderation are made late, and when breaking in an accelerator pedal 30 and a brake pedal 31 ordinarily, whenever [target acceleration-and-deceleration] is computed with the calculation means 2 whenever [target acceleration-and-deceleration] so that acceleration and moderation may be made common.

[0018] Moreover, the rate of a precedence vehicle is slower than whenever [setting speed / of a self-vehicle], and when the distance to a precedence vehicle is smaller than the set point, in some cases, I want to run by the automatic rate control mode, and to pass a precedence vehicle. In that case, the one-touch switch for passing is pushed. As become the mode of the acceleration large switch 23, it becomes the mode of a power mode (sport mode) 27 or it becomes the mode when breaking in an accelerator pedal 30 rapidly temporarily, it can be made to perform smooth passing by pushing this one-touch switch. However, this one-touch switch is [at the time of acceleration] temporary, and when acceleration finishes, it is made to return to the original operation mode automatically.

[0019] As mentioned above, it is possible to form a mode selection switch whenever [acceleration-and-deceleration / which can choose in the example whenever / acceleration-and-deceleration / which a driver wishes], or to get the information from the mode selection switch of an automatic transmission, or to learn transit mode from the operational characteristics of a driver, and to choose the mode whenever [acceleration-and-deceleration] automatically.

[0020]

[Effect of the Invention] According to this invention, automatic transit control which can reflect the volition of a driver can be realized, and a transit feeling can be improved.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram showing the configuration of the automatic speed regulating device of a car.

[Drawing 2] The system chart of the automatic speed regulating device of a car.

[Drawing 3] It is one example of a mode selection means whenever [acceleration-and-deceleration].

[Drawing 4] It is one example of a mode selection means whenever [acceleration-and-deceleration].

[Drawing 5] It is one example of a mode selection means whenever [acceleration-and-deceleration].

[Description of Notations]

1 -- An automatic rate control section, 2 -- It is a calculation means and 3 whenever [target acceleration-and-deceleration]. -- Driver actuation switch, 4 -- A speed sensor, 5 -- An engine control section, 6 -- Throttle actuator, 7 [-- Setting vehicle speed storage means,] -- An engine, 8 -- A change gear control section, 9 -- A change gear, 10 11 -- It is a mode selection means and 12 whenever [acceleration-and-deceleration]. -- A radar installation, 13 -- Brake control section, 14 [-- Whenever / acceleration-and-deceleration / Mode selection switch,] -- A brake, 15 -- An acceleration switch, 16 -- A moderation switch, 22 23 -- It is a large switch and 24 whenever [acceleration-and-deceleration]. -- It is a switch and 25 inside whenever [acceleration-and-deceleration]. -- The degree smallness switch of acceleration and deceleration, 26 -- The mode selection switch of an automatic transmission, 27 -- Power-mode switch (sport mode switch), 28 [-- A brake pedal, 32 / -- Operational characteristics of a driver.] -- A normal mode switch, 29 -- An economy mode switch (Snow mode switch), 30 -- An accelerator pedal, 31

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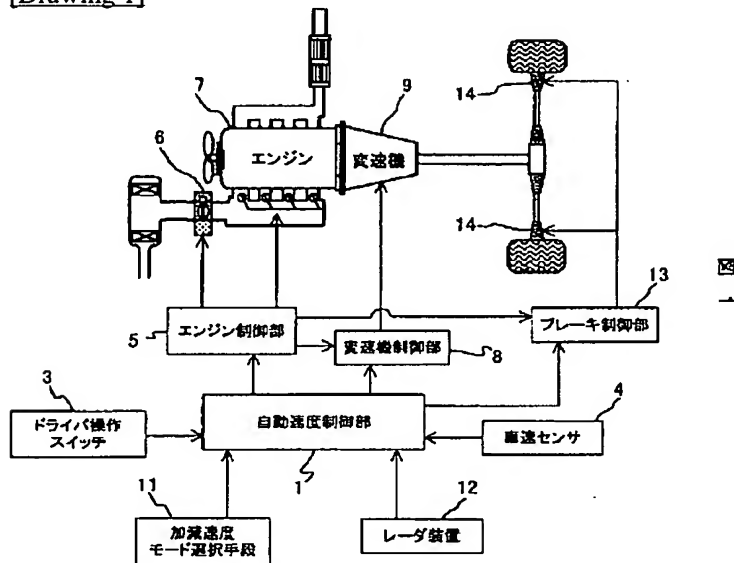
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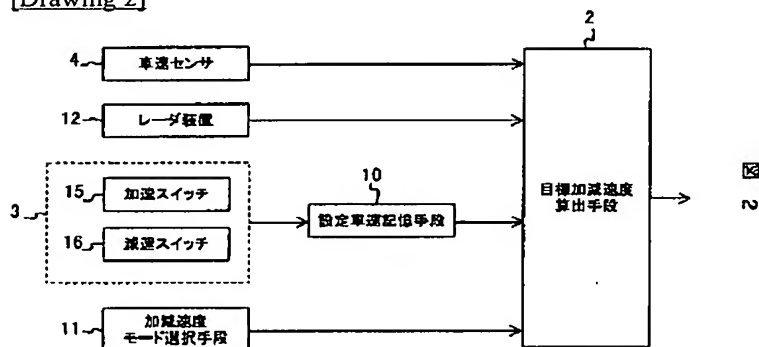
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DRAWINGS

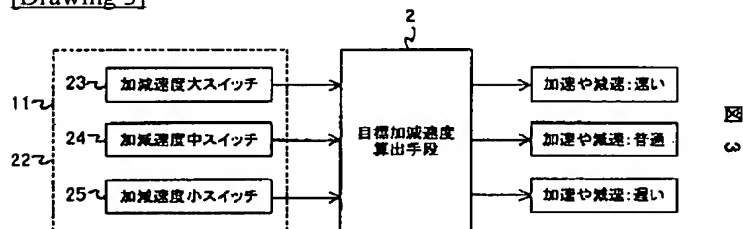
[Drawing 1]



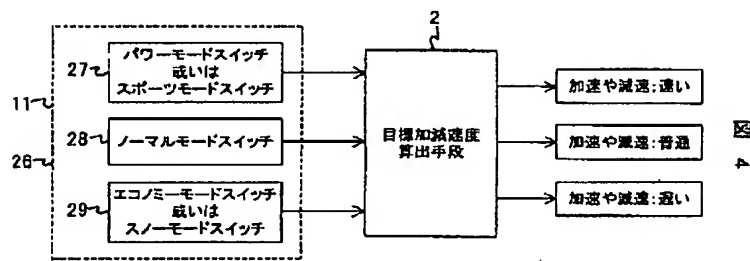
[Drawing 2]



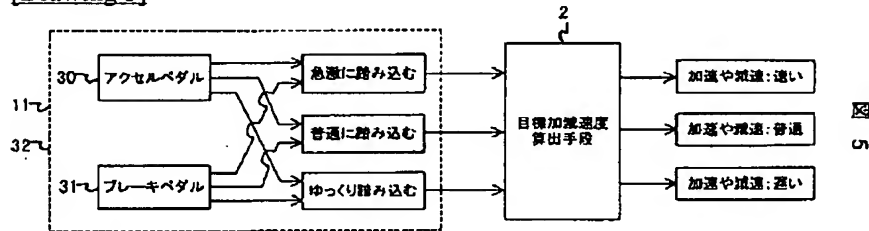
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]

【特許請求の範囲】

【請求項 1】車両の実車速を検出する実車速検出手段と、ドライバが希望する車速を設定する手段と、前記車速を記憶する設定車速記憶手段と、前記実車速を設定車速に一致させるべくスロットルアクチュエータや変速機やブレーキを操作する車両の自動速度制御装置において、ドライバが希望する加減速度を選択できる加減速度モード選択手段を設けたことを特徴とする車両の自動速度制御装置。

【請求項 2】請求項 1 に記載の車両の自動速度制御装置において、前記加減速度モード選択手段として、加減速度モード選択スイッチを設けたことを特徴とする車両の自動速度制御装置。

【請求項 3】請求項 1 に記載の車両の自動速度制御装置において、前記加減速度モード選択手段として、オートマチックトランスミッションのモード選択スイッチからの情報をもらい、加減速度モードを選択することを特徴とする車両の自動速度制御装置。

【請求項 4】請求項 1 に記載の車両の自動速度制御装置において、前記加減速度モード選択手段として、ドライバの運転特性から走行モードを学習して、自動的に加減速度モードを選択することを特徴とする車両の自動速度制御装置。

【請求項 5】請求項 2、請求項 3、及び請求項 4 に記載の車両の自動速度制御装置において、急加速専用のワンタッチスイッチを設けたことを特徴とする車両の自動速度制御装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、車両の走行速度である実車速をドライバが希望する設定車速に保つ車両の自動速度制御装置に関するものである。

【0002】

【従来の技術】この種の車両の自動速度制御装置としては、特開平 9-86224 号公報のように、ドライバが設定した設定車速と実車速との車速偏差から目標加減速度を求め、この目標加減速度に基づいてスロットルを制御することで定速走行を実現させる車両の自動速度制御装置が知られている。

【0003】

【発明が解決しようとする課題】しかしながら、前記従来技術では、自動速度制御時の目標加減速度が車速偏差から算出されるため、必ずしもドライバの意図を反映できない場合がある。

【0004】本発明では、ドライバの好みに合った加減速度が得られるように、加減速度モード選択手段を設けて、ドライバの意思に従った車両挙動を実現することのできる車両の自動速度制御装置を提供することにある。

【0005】

【課題を解決するための手段】上記目的を達成するため

に、本発明は、車両に搭載され、同車両の走行速度を調整可能なアクチュエータや変速機やブレーキと、車両の実車速を検出する実車速検出手段と、先行車両までの車間距離を検出する手段と、ドライバが希望する設定車速を操作できる設定手段と、前記設定車速を記憶する設定車速記憶手段と、ドライバが希望する加減速度を選択できる加減速度モード選択手段と、実車速を設定車速に一致させるべく、目標加減速度を算出する際に、前記加減速度モード選択手段の状態と車速偏差（設定車速と実車速の差）に基づいて目標加減速度を算出する目標加減速度算出手段と、前記目標加減速度を満たすように前記アクチュエータや変速機やブレーキを操作することを特徴とする車両の自動速度制御装置である。

【0006】本発明では、例えば、前記記載の車両の自動速度制御装置において、前記加減速度モード選択手段として、加減速度モード選択スイッチを設けたり、オートマチックトランスミッションのモード選択スイッチからの情報をもらい加減速度モードを選択したり、ドライバの運転特性から走行モードを学習して自動的に加減速度モードを選択したりすることにより上記目的を達成できる。

【0007】

【発明の実施の形態】以下、本発明を具現化した実施例を図 1～図 5 に従って説明する。

【0008】図 1 は本実施例の車両の自動速度制御装置の構成を示すブロック図である。

【0009】自動速度制御部 1 は車速センサ 4 より実車速を、レーダ装置 12 より先行車両までの車間距離を入力し、また、ドライバ操作スイッチ 3 から入力された設定車速に一致させるべく、加減速度モード選択手段 11 の入力と上記設定車速と上記実車速の差に基づいて目標加減速度を算出し、エンジン制御部 5 に出力する。エンジン制御部 5 は、自動速度制御部 1 より入力した目標加減速度に基づいて、エンジン 7 およびスロットルアクチュエータ 6 を制御し、エンジン出力を増加減する。変速機 9 を制御する必要がある場合は、自動速度制御部 1 またはエンジン制御部 5 から変速機制御部 8 に指令を出力し変速機 9 の制御を実行させる。また、ブレーキ 14 を制御する必要がある場合は、自動速度制御部 1 またはエンジン制御部 5 から、ブレーキ制御部 13 に指令を出力しブレーキ 14 の制御を実行させる。

【0010】次に自動速度制御部 1 において目標加減速度を導出する処理について、図 2 を用いて説明する。

【0011】図 2 において、ドライバ操作スイッチ 3 はドライバが希望する設定車速を入力するための、加速スイッチ 15 と減速スイッチ 16 から成る入力装置である。本入力装置は、ドライバが加速スイッチ 15 を入力した場合はある車速幅で設定車速を増加させ、減速スイッチ 16 を入力した場合はある車速幅で設定車速を減少させて、設定車速記憶手段 10 で記憶する。ここで、車

速幅は一律としても可変としてもよい。

【0012】加減速度モード選択手段11は、ドライバが希望する加減速度を選択するスイッチである。

【0013】目標加減速度算出手段2は、実車速を設定車速に一致させるべく、前記加減速度モード選択手段11の状態と、ドライバ操作スイッチ3で設定した設定車速と車速センサ4から入力された実車速の差に基づいて目標加減速度を算出する。

【0014】このとき、レーダ装置12で先行車までの車間距離を測定しているが、先行車までの車間距離が設定値以上の場合は予めドライバ操作スイッチ3で設定した設定車速を保持し、先行車までの距離が前記設定値より小さい場合には車間距離を所定に保つようにする。

【0015】ドライバの意志を反映することのできる自動運転制御を実現するには、一つの例として図3のように、加減速度モード選択手段11として、ドライバが希望する加減速度を選択できる加減速度モード選択スイッチ22を設ける。加減速度モード選択スイッチ22は、例えば、加減速度大スイッチ23・加減速度中スイッチ24・加減速度小スイッチ25の3段階に分かれており、ドライバが加減速度大スイッチ23を選択した場合には加速や減速を速くし、加減速度中スイッチ24を選択した場合には加速や減速を普通にし、加減速度小スイッチ25を選択した場合には加速や減速を遅くするように、目標加減速度算出手段2で目標加減速度を算出して、ドライバが希望する加減速度モードを選択できるようにする。

【0016】二つ目の例として図4のように、加減速度モード選択手段11として、変速機9がオートマチックトランスミッション(ATや自動MT)の場合、オートマチックトランスミッションのモード選択スイッチ26からの情報をもらう。オートマチックトランスミッションのモード選択スイッチ26は、例えば、パワーモードスイッチ(スポーツモードスイッチ)27・ノーマルモードスイッチ28・エコノミーモードスイッチ(スノーモードスイッチ)29の3段階に分かれており、パワーモードスイッチ(スポーツモードスイッチ)27を選択した場合には加速や減速を速くし、ノーマルモードスイッチ28を選択した場合には加速や減速を普通にし、エコノミーモードスイッチ(スノーモードスイッチ)29を選択した場合には加速や減速を遅くするように、目標加減速度算出手段2で目標加減速度を算出して、ドライバが希望する加減速度モードを選択できるようにする。

【0017】三つ目の例として図5のように、加減速度モード選択手段11として、ドライバの運転特性32から走行モードを学習して自動的に加減速度を選択する。例えば、ドライバがアクセルペダル30やブレーキペダル31を急激に踏みこむ癖がある場合には加速や減速を速くし、アクセルペダル30やブレーキペダル31をゆっくり踏みこむ癖がある場合には加速や減速を遅くし、

アクセルペダル30やブレーキペダル31を普通に踏み込む場合は、加速や減速を普通にするように、目標加減速度算出手段2で目標加減速度を算出する。

【0018】また、自動速度制御モードで走行している、先行車の速度が自車の設定速度より遅く、先行車までの距離が設定値より小さい場合に、先行車を追い越したいことがある。その場合、追い越しをするためのワンタッチスイッチを押す。このワンタッチスイッチを押すことによって、一時的に、加減速度大スイッチ23のモードになったり、パワーモード(スポーツモード)27のモードになったり、アクセルペダル30を急激に踏み込んだときのモードになるようにして、スムーズな追い越しができるようにする。ただし、このワンタッチスイッチは、加速時の一時的なもので、加速が終わったときには、また元の運転モードに自動的に戻るようにしておく。

【0019】以上、実施例では、ドライバの希望する加減速度を選択できる加減速度モード選択スイッチを設けたり、オートマチックトランスミッションのモード選択スイッチからの情報をもらったり、ドライバの運転特性から走行モードを学習して自動的に加減速度モードを選択したりする事が可能である。

【0020】

【発明の効果】本発明によれば、ドライバの意志を反映することのできる自動走行制御を実現でき、走行フィーリングを改善することができる。

【図面の簡単な説明】

【図1】車両の自動速度制御装置の構成を示すブロック図。

【図2】車両の自動速度制御装置のシステム図。

【図3】加減速度モード選択手段の一実施例。

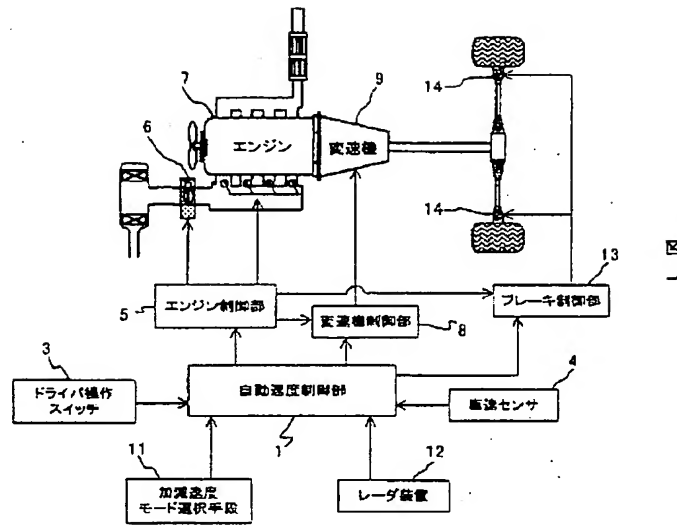
【図4】加減速度モード選択手段の一実施例。

【図5】加減速度モード選択手段の一実施例。

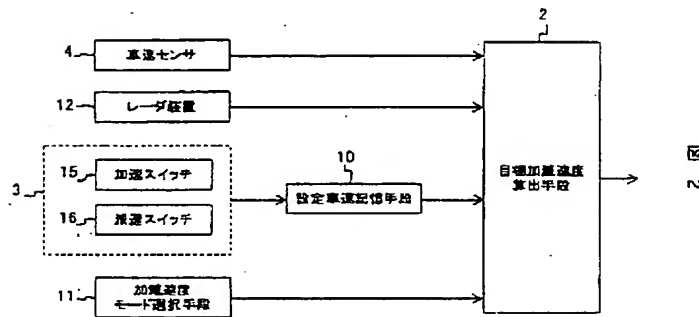
【符号の説明】

1…自動速度制御部、2…目標加減速度算出手段、3…ドライバ操作スイッチ、4…車速センサ、5…エンジン制御部、6…スロットルアクチュエータ、7…エンジン、8…変速機制御部、9…変速機、10…設定車速記憶手段、11…加減速度モード選択手段、12…レーダ装置、13…ブレーキ制御部、14…ブレーキ、15…加速スイッチ、16…減速スイッチ、22…加減速度モード選択スイッチ、23…加減速度大スイッチ、24…加減速度中スイッチ、25…加減速度小スイッチ、26…オートマチックトランスミッションのモード選択スイッチ、27…パワーモードスイッチ(スポーツモードスイッチ)、28…ノーマルモードスイッチ、29…エコノミーモードスイッチ(スノーモードスイッチ)、30…アクセルペダル、31…ブレーキペダル、32…ドライバの運転特性。

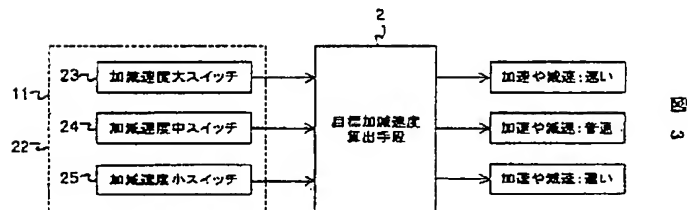
【図1】



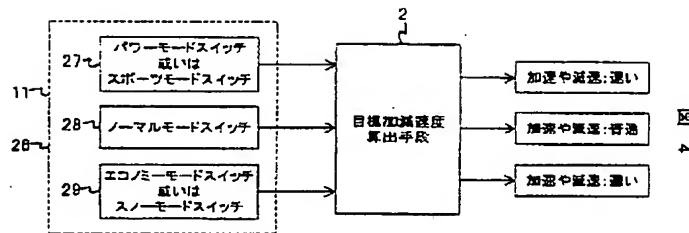
【図2】



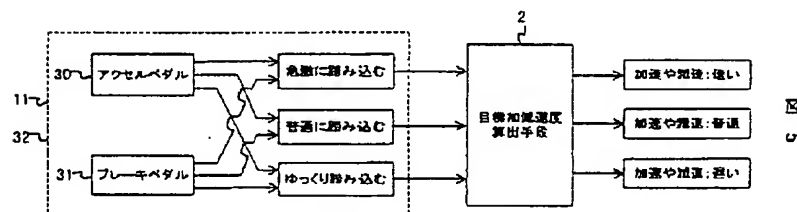
【図3】



【図4】



【図5】



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